bibliography of paleobotany. The first volume contains the titles of 1908, and is divided into two sections: (1) an author list (pp. 17), which includes 309 entries; and (2) a subject list (pp. 200), by which one may find at once any plant referred to. The number of titles is increased by the fact that the list includes many papers on living forms which are related in some way to the interpretation of paleobotanical material. In these days, when paleobotany is becoming such a necessary part of morphology, such a volume has become indispensable.—J. M. C.

A revision of the genus Eucalyptus.—The title-page and index received recently completes the first volume of *A critical revision of the genus Eucalyptus* by J. H. MAIDEN.[10] In this volume the author treats 40 species, giving detailed descriptions, synonomy, distribution, and much supplementary information; these species and their known varieties and forms are illustrated by 48 admirable plates. The work is an exhaustive and authoritative treatment of this highly interesting and economically important group of plants, and it is a pleasure to note that it is being continued; the first part of the second volume, containing nine species and four plates, has already been issued.—J. M. GREENMAN.

Illinois State Academy of Science.—The third volume (1910) of Transactions contains the following botanical papers: The vegetational history of a blow-out (abstract), by H. A. GLEASON; Preliminary account of the forest successions on Isle Royale, Lake Superior (abstract), by W. S. COOPER; The forest associations of northwestern Illinois, by H. S. PEPOON.—J. M. C.

NOTES FOR STUDENTS

Plant diseases.—BANCROFT[11] has studied the life history of *Cladosporium herbarum* and finds that this fungus, known to be common on dead leaves, is connected with a parasitic stage which from its fructification would be classed in the form genus *Hormodendron*. The *Hormodendron* form makes holes in the leaves of many plants, among which are cucumber, melon, and cabbage. It is mentioned as epidemic in cucumber leaves. The holes are said not to be formed by the drying and falling out of areas of tissues, as in leaf-spot diseases. In this case the perforations occur from the first and increase in size, often running together so as to form large irregular holes. The margins are surrounded by a narrow line of dead brownish tissue. From the tissues surrounding the holes conidiophores of *Hormodendron* appear and produce branched chains of conidia. In cultures from these chains, conidia of *Hormodendron* were at first produced, but as the cultures became older only those of *Cladosporium* were formed.

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[10] MAIDEN, J. H., A critical revision of the genus *Eucalyptus*. 4to. pp. 349. *pls. 48*. Sydney: William Applegate Gullick. 1903–1909.

[11] BANCROFT, C. K., Researches on the life history of parasitic fungi. I. *Cladosporium herbarum* Link. Annals of Botany **24**:359–372. *pl. 1*. 1910.

It was found also that on dead or dying leaves infected with *Hormodendron* the conidia of that form gave way to fructifications of *Cladosporium*. It seems, therefore, that during the actively parasitic life of the fungus *Hormodendron* conidia are formed, but at the end of the growing season *Cladosporium* develops on the dead and fallen leaves. The conidiophores of *Cladosporium* arise from a sclerotium-like mass of fungous cells. The author finds that the cells of this sclerotium retain their vitality through the winter and give rise to conidiophores of *Cladosporium* in the spring. The disease is probably propagated by means of these sclerotia and conidia.

In order to describe the means by which some of the parasitic fungi whose ascospores are either not often found or are entirely unknown to persist through the winter, EWERT[12] has studied the effect of low temperature on the conidia of several species. The pycnidia of *Mycosphaerella sentina* Kleb. on fallen pear leaves left exposed during the winter were found to contain numerous conidia capable of germination during all the months of winter and as late as June, when new infections of the fungus appeared in the orchards. The temperature during the winter ranged as low as $-22°.2$. Infection experiments with these conidia were not successful, but this the author attributes to faulty methods of manipulation. Infections with other conidia which had been exposed to low temperatures for a short time were successful. The conidia of *Pseudopeziza Ribis* Kleb. were also shown to retain their vitality through the winter. Conidia of *Fusicladium pirinum* and *F. dendriticum* subjected to low temperatures once or several times were still capable of germination, although in this case the matter is of less importance, since both of these fungi form ascospores regularly, and moreover have a perennial mycelium.

BROOKS and BARTLETT[13] report on two diseases of gooseberry bushes caused by *Botrytis cinerea* and *Cytosporina Ribis*. The first indication that plants are attacked by *Botrytis* is the wilting of one or more branches. Later the basal parts of such branches show great numbers of conidiophores of *B. cinerea* arising from sclerotia situated just outside of the woody cylinder. At this time it is found that the pith, wood, and bast are filled with mycelium. The fact that the wood is infected is particularly interesting, as *Botrytis* generally attacks only the soft parenchymatous tissues. It appears, however, that in this case lignified walls are not affected by the fungus, which makes its way through the vessels, and passes from cell to cell through the pits. The composition of the lignified tissues appears not to be changed. The food substances of the medullary rays are used up, but nothing is said of the contents of the wood parenchyma. Infections were produced by inserting into wounds

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[12] EWERT, R., Die Ueberwinterung von Sommerkonidien pathogener Ascomyceten und die Widerstandsfähigkeit derselben gegen Kälte. Zeitschr. Pflanzenkrank. **20**: 129–141. *figs. 2.* 1910.

[13] BROOKS, F. T., and BARTLETT, A. W., Two diseases of gooseberry bushes. Ann. Myc. **8**:167–183. *pl. 1.* 1910.

small pieces of grape juice gelatin, in which the mycelium of the fungus was growing. Inoculation experiments with spores were not successful. The authors suggest that plants in nature may become infected through aphis punctures, the honey dew furnishing a means for the germination of the spores, or by means of frost injuries, or by accidental wounds made in picking the fruit. Since infection by any of these means was not demonstrated, and the authors' own infection experiments with conidia were unsuccessful, these suggestions would be more convincing if supported by more experimentation and less theory.

The disease produced by *Cytosporina Ribis* resembles in its general effects that caused by *Botrytis*. The infection takes place through a wound, as is shown by the universal occurrence of an old scar or dead stump at the point from which the disease spreads. Cross-sections of infected branches show that the wood is brown and discolored except for a lighter sector-shaped area. The wood is permeated with hyphae which, unlike those of *Botrytis*, are able to dissolve the lignified elements of the stem. The progress of the mycelium is accompanied by the formation of wound-gum which accumulates in the cells and vessels. The gum, at least in the wood parenchyma and medullary rays, appears to be formed from the starch. It seems that the accumulation of gum occurs only within the cells and does not involve the destruction of whole areas of tissues, as in most cases of gummosis.

McAlpine[14] reports a number of laboratory experiments with *Phytophthora infestans*, among which is an attempt to determine the possibility of destroying the mycelium in infected potato tubers without destroying the life of the tubers. Slices taken from diseased tubers were subjected to a temperature of 49° for four hours, and the fungus was found to have been destroyed. Afterward seed potatoes were subjected to the same heat and were found to sprout freely, hence the conclusion that seed potatoes can be thoroughly disinfected in the way described. It seems that the method should at least have been given a more extended trial to justify the conclusion, for it is not unlikely that whole tubers would be injured if subjected to that temperature long enough to kill the mycelium in their interior, although the mycelium might be readily killed in thin slices. The author does not state whether the slices in which the mycelium was actually killed retained their vitality through the treatment or not. Neither does he state that the seed potatoes used were diseased before the treatment and free from disease afterward.—H. Hasselbring.

The species of Penicillium and Aspergillus.—The forms of Fungi imperfecti grouped under the name *Penicillium*, on account of their omnivorous habits, have served as subjects for numerous physiological investigations, but as a rule little attention has been given to the determination of the species in

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[14] McAlpine, D., Some points of practical importance in connection with the life history stages of *Phytophthora infestans* (Mont.) DeBary. Ann. Myc. 8:156–166. *pl. 1.* 1910.